Docket No.: 13077-00158-US
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Stephan Kirchmeyer et al.

Application No.: 10/627,162 | Confirmation No.: 2513

Filed: July 25, 2003 | Art Unit: 1714

For: AQUEOUS DISPERSION CONTAINING A COMPLEX OF POLY (3,4-DIALKOXYTHIOPHENE) AND A POLYANION AND METHOD FOR PRODUCING THE SAME | Examiner: Vickey Marie Nerangis

APPEAL BRIEF

MS Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Madam:

As required under § 41.37(a), this brief is filed within two months of the Notice of Appeal filed in this case on July 9, 2009, and is in furtherance of said Notice of Appeal.

The fees required under § 41.20(b)(2) are dealt with in the accompanying TRANSMITTAL OF APPEAL BRIEF.

This brief contains items under the following headings as required by 37 C.F.R. § 41.37 and M.P.E.P. § 1205.2:

I. REAL PARTY IN INTEREST

The real party in interest for this appeal is:

H. C. Starck GmbH

II. RELATED APPEALS AND INTERFERENCES

There are no other appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS

A. Total Number of Claims in Application

There are 20 claims pending in application.

B. Current Status of Claims

1. Claims canceled: 1-6, 25, 26
2. Claims withdrawn from consideration but not canceled: none
3. Claims pending: 7-24, 27 and 28
4. Claims allowed: none
5. Claims rejected: 7-24, 27 and 28
6. Claims objected to: none

C. Claims On Appeal

The claims on appeal are claims 7-24, 27 and 28

IV. STATUS OF AMENDMENTS

Applicant filed an Amendment After Final Rejection on July 9, 2009. The Examiner responded to the Amendment After Final Rejection in an Advisory Action mailed July 15, 2009. In the Advisory Action, the Examiner indicated that Applicants' proposed amendments to claims

27 and 28 would be entered. The Examiner indicated that the Reply has overcome the rejections under 35 U.S.C. 112.

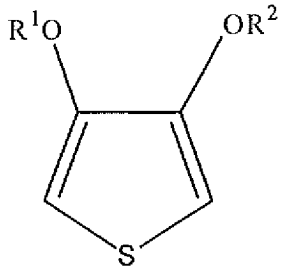
The applicant has filed a terminal disclaimer on August 11, 2009 which should antedate the double patenting rejection. PAIR indicated that the terminal disclaimer was approved.

Accordingly, the claims enclosed herein as Appendix A do incorporate the amendments to claims 27 and 28, as indicated in the paper filed.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Of the 20 claims on appeal, claims 7, 8, 9, and 1;,0 are independent. Claims 7, 8, 9 and 10 are as follows:

7. A method for producing an aqueous dispersion containing a complex of a poly(3,4-alkylenedioxythiophene) and a polyanion comprising: polymerizing a 3,4-alkylenedioxythiophene represented by formula (1):



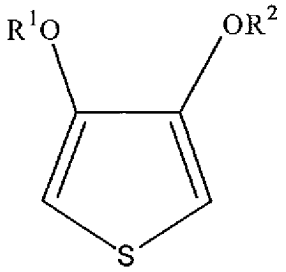
(1)

wherein R^1 and R^2 together form a C_{1-4}-alkylene group which is optionally substituted, wherein the polymerization is performed in the presence of the polyanion by using peroxodisulfuric acid as an oxidizing agent in an aqueous solvent and wherein the pH during polymerization is 1.5 or less and wherein said aqueous solvent is water and said polyanion is a polystyrene sulfonic acid. [support can be found in the

specification at page 3, lines 13-22 and page 7, lines 17-18 and the example for polystyrene sulfonic acid]

8. A method for producing an aqueous dispersion containing a complex of poly(3,4-dialkylenedioxythiophene) and a polyanion comprising:

polymerizing a 3,4-alkylenedioxythiophene represented by formula (1):

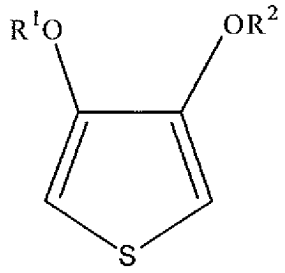


(1)

wherein R^1 and R^2 together form a C_{1-4}-alkylene group which is optionally substituted, and wherein the polymerization is performed in the presence of the polyanion by using peroxodisulfuric acid as an oxidizing agent in an aqueous solvent, in which an acid selected from the group of water-soluble inorganic acids and water-soluble organic acids is added so as to lower pH of the resultant reaction mixture to 1.5 or less and wherein said aqueous solvent is water and said polyanion is a polystyrene sulfonic acid. [support can be found in the specification at page 4, lines 10-21 and page 7, lines 17-18 and the example for polystyrene sulfonic acid]

9. A method for producing an aqueous dispersion containing a complex of a poly(3,4-dialkoxythiophene) and a polyanion comprising:

polymerizing a 3,4-dialkoxythiophene represented by formula (1):

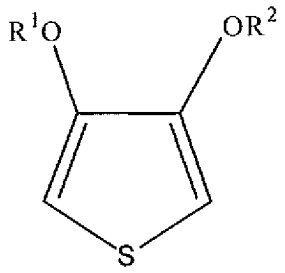


(1)

wherein R^1 and R^2 are C_{1-4}-alkyl groups, wherein the polymerization is performed in the presence of the polyanion by using peroxodisulfuric acid as an oxidizing agent in an aqueous solvent and wherein the pH during polymerization is 1.5 or less and wherein said aqueous solvent is water and said polyanion is a polystyrene sulfonic acid. [support can be found in the specification at page 3, line 24- page 4, line 9 and page 7, lines 17-18 and the example for polystyrene sulfonic acid]

10. A method for producing an aqueous dispersion containing a complex of poly(3,4-dialkoxythiophene) and a polyanion comprising:

polymerizing a 3,4-dialkoxythiophene represented by formula (1):



(1)

wherein R^1 and R^2 are C_{1-4}-alkyl groups, and wherein the polymerization is performed in the presence of the polyanion by using peroxodisulfuric acid as an oxidizing agent in an aqueous solvent, in which an acid selected from the group of water-soluble inorganic acids and water-soluble organic acids is added so as to lower pH of the resultant reaction mixture to 1.5 or less and wherein said aqueous solvent is water and said polyanion is a polystyrene sulfonic acid. [support can be found in the specification at page 4, lines 10-21 and page 7, lines 17-18 and the example for polystyrene sulfonic acid]

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

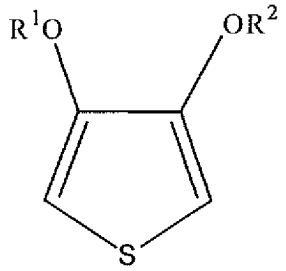
1. Claims 7-24, 27, and 28 are rejected under 35 U.S.C. 103(a) as being unpatenable over US 5,300,575 (Jonas et al) in view of US 4,728,399 (Moehwald).

2. Claims 7-14 were rejected on the ground of non-statutory double patenting over claims 3-5 of copending Application No. 11/178,852 (published as US 2006/0020092).

VII. ARGUMENT

1. Claims 7-24, 27, and 28 are rejected under 35 U.S.C. 103(a) as being unpatenable over Jonas in view of Moehwald.

The applicant's claimed invention relates to a method for producing an aqueous dispersion containing a complex of a poly(3,4-alkylenedioxythiophene) and a polyanion comprising: polymerizing a 3,4-alkylenedioxythiophene represented by formula (1):



(1)

wherein R^1 and R^2 are C_{1-4}-alkyl groups (see claims 9 and 10) or together form a C_{1-4}-alkylene group (see claims 7 and 8) which is optionally substituted, wherein the polymerization is performed in the presence of the polyanion by using peroxodisulfuric acid as an oxidizing agent in an aqueous solvent [and in which an acid selected from the group of water-

soluble inorganic acids and water-soluble organic acids is added][1] and wherein the pH during polymerization is 1.5 or less and wherein said aqueous solvent is water and said polyanion is a polystyrene sulfonic acid.

Jonas discloses a polymerization of 3,4-alkylenedioxy-thiophenes, wherein 3,4-alkylenedioxythiophene, a polyacid, an oxidizing agent. Further, Jonas describes that the oxidizing agents typically used for the polymerization of thiophene derivatives are oxidizing agents being utilized for the oxidative polymerization of pyrrole (col. 3, lines 10-15).

As the Examiner has correctly recognized at page 3 of the Office Action mailed March 21, 2008, second full paragraph, Jonas does not disclose the use of peroxodisulfuric acid as an oxidizing agent. In addition, Jonas does not disclose the applicant's claimed pH. It is recognized that Jonas does disclose that strong acids can be added to increase the polymerization rate (see col. 4, lines 22-26).

Moehwald relates to the preparation of laminates of metals and electrically conductive polymers (see the title). Moehwald describes inter alia the polymerization of pyrrole by using an oxidizing agent (see col. 2, lines 14-24). Oxidizing agents which have proven to be particularly useful are peroxoacids, such as peroxodisulfuric acid (see col. 3, lines 3-5).

The Examiner argues that the combination of the teachings of Jonas and Moehwald would result in the applicant's claimed invention as by using peroxodisulfuric acid as oxidizing agent the pH-value is lowered to control the polymerization rate (see page 3 of the Office Action mailed March 21, 2008, fourth full paragraph). The applicant respectfully does not agree with the Examiner that by decreasing the pH-value the polymerization can be controlled.

An important feature of the applicant's claimed invention is that a low pH-value (1 .5 or

[1] Appears only in independent claims 8 and 10

less) leads to an increased conductivity and an improved transparency of films containing an aqueous dispersion produced according to the applicant's claimed methods (see claims 7-10 and table 1 and page 20 of the specification). One of ordinary skill in the art would not expect the applicant's results with respect to transparency and conductivity when such a low pH-value is used for carrying out the reaction. The pH-value is adjusted by adding an acid to the reaction mixture. The advantageous effect of adding an acid to the reaction mixture is established when comparing Example 13 with Examples 15-18 or Comparative example 3 in Table 2. In these examples, peroxodisulfuric acid is used as oxidizing agent but in Examples 14-18 additional acids are added. These additional acids lead to an increased conductivity, i.e. an additional acid has a beneficial effect on the conductivity.

It is noted that the Examiner stated that (1) the results from Table 2 of the applicant's specification were not a proper side by side comparison and that (2) the claims were not commensurate with respect to the polyanions (see the second full paragraph at page 5 of the office action August 14, 2007).

Examples 13-18 use the compositions obtained in examples 7-12 (see page 17 examples 13 and examples 14 to 18). The compositions of examples 7-12 are identical except that the water dispersion obtained in Example 1, was replaced by each of the water dispersions obtained in examples 2 to 6 so that 100 parts of a coating composition were obtained (see page 16, line 30 through page 7, line 2 of the specification).

Preferably peroxodisulfuric acid is used as an oxidizing agent as no additional acid is necessary to adjust the desired pH-value, but as shown in Table 2 the addition of another acid does not have any negative effect on the film properties. In contrast, by adding another acid, better results are obtained. The applicant believes that the results show that the surface resistivity

was lowered when using the applicant's claimed invention (see pages 19 and 20 of the applicant's specification).

The applicant believes that limiting the polyanion to polystyrene sulfuric acid and the aqueous solvent to water, that the claims are commensurate in scope with the claimed invention.

By decreasing the pH-value the polymerization rate is being increased. The kinetics of this reaction is very complex and a person of ordinary skill in the art could hardly predict the effect of the kinetics on the end product. Basically, a person of ordinary skill in the art would expect that fast reactions are less selective and hence should lead to more side reactions. In other words, different end products should be obtained having different particle sizes and molar weights. The faster the reaction rate the less controllable is the reaction, i.e. the more side reactions are occurring leading to different end products. Normally, the growth of the particles can not be controlled by having fast reactions, i.e. again different end products are obtained. Summarized, one of ordinary skill in the art would not expect getting an end product having improved properties (excellent transparency and conductivity compared to the aqueous dispersions known in the prior art) by using a strong acid which increases the polymerization rate. On the contrary, based on the above arguments, it is a surprising effect that by increasing the polymerization rate, thereby getting a complex kinetics, the end products do show improved properties compared to the aqueous dispersions known in the prior art. Consequently, the kinetics of this reaction gets quite complex and one skilled in the art could hardly predict the effect of the kinetics on the end product. One of ordinary skill in the art would prefer a controllable reaction, i.e. a slow reaction, to get improved properties of the end product.

A statement that modifications of the prior art to meet the claimed invention would have been "obvious to one of ordinary skill in the art at the time the invention was made" because the references relied upon teach that all aspects of the claimed invention were individually known in

the art is not sufficient to establish a *prima facie* case of obviousness without some objective reason to combine the teachings of the references. *Ex parte Levengood*, 28 USPQ2d 1300 (Bd. Pat. App. & Inter. 1993). See MPEP § 2143.01 IV. "[R]ejections on obviousness cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *KSR International Co. v. Teleflex Inc.*, 82 USPQ2d 1385, 1396 (2007) quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006). Furthermore, the Examiner cannot selectively pick and choose from the disclosed parameters without proper motivation as to a particular selection. The mere fact that a reference may be modified to reflect features of the claimed invention does not make the modification, and hence the claimed invention, obvious unless the prior art suggested the desirability of such modification. *In re Mills*, 916 F.2d 680, 682, 16 USPQ2d 1430 (Fed. Cir. 1990); *In re Fritch*, 23 USPQ2d 1780 (Fed. Cir. 1992). Thus, it is impermissible to simply engage in a hindsight reconstruction of the claimed invention where the reference itself provides no teaching as to why the applicant's combination would have been obvious. *In re Gorman*, 933 F.2d 982, 987, 18 USPQ2d 1885, 1888 (Fed. Cir. 1991). The applicant believes that this is a hindsight reconstruction.

In the applicant's case it is surprising that the use of a low pH-value has a beneficial effect on the properties of the end product (see conductivity and transparency of the film) — hence the use of peroxodisulfuric acid as an oxidizing agent alone or the use of peroxodisulfuric acid in combination with other acids is not obvious.

2. Double Patenting Rejection

Claims 7-14 were rejected on the ground of non-statutory double patenting over claims 3-5 of copending Application No. 11/178,852 (published as US 2006/0020092). The applicant filed a Terminal Disclaimer on 11/178,852 with the USPTO on August 11, 2009. The USPTO approved the terminal. Therefore this rejection no longer is applicable.

VIII. CLAIMS

A copy of the claims involved in the present appeal is attached hereto as Appendix A. As indicated above, the claims in Appendix A include the amendments filed by Applicant on July 9, 2009.

Applicant believes no fee is due with this response. However, if a fee is due, please charge our Deposit Account No. 03-2775, under Order No. 13077-00158-US from which the undersigned is authorized to draw.

Dated: September 9, 2009

Respectfully submitted,

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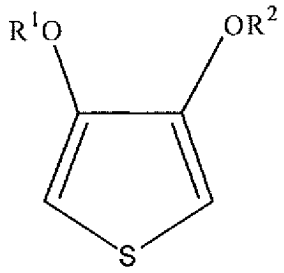
APPENDIX A

Claims Involved in the Appeal of Application Serial No. 10/627,162

Claims 1 - 6 (Cancelled)

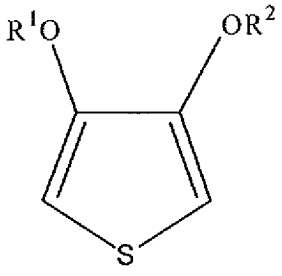
7. (Previously Presented) A method for producing an aqueous dispersion containing a complex of a poly(3,4-alkylenedioxythiophene) and a polyanion comprising: polymerizing a 3,4-alkylenedioxythiophene represented by formula (1):



(1)

wherein R^1 and R^2 together form a C_{1-4}-alkylene group which is optionally substituted, wherein the polymerization is performed in the presence of the polyanion by using peroxodisulfuric acid as an oxidizing agent in an aqueous solvent and wherein the pH during polymerization is 1.5 or less and wherein said aqueous solvent is water and said polyanion is a polystyrene sulfonic acid.

8. (Previously Presented) A method for producing an aqueous dispersion containing a complex of poly(3,4-dialkylenedioxythiophene) and a polyanion comprising: polymerizing a 3,4-alkylenedioxythiophene represented by formula (1):



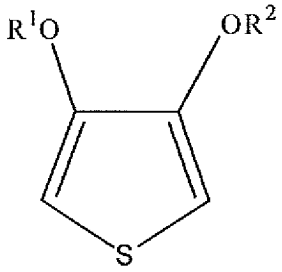
(1)

wherein R^1 and R^2 together form a C_{1-4}-alkylene group which is optionally substituted, and

wherein the polymerization is performed in the presence of the polyanion by using peroxodisulfuric acid as an oxidizing agent in an aqueous solvent, in which an acid selected from the group of water-soluble inorganic acids and water-soluble organic acids is added so as to lower pH of the resultant reaction mixture to 1.5 or less and wherein said aqueous solvent is water and said polyanion is a polystyrene sulfonic acid.

9. (Previously Presented) A method for producing an aqueous dispersion containing a complex of a poly(3,4-dialkoxythiophene) and a polyanion comprising:

polymerizing a 3,4-dialkoxythiophene represented by formula (1):

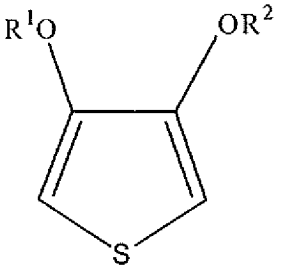


(1)

wherein R^1 and R^2 are C_{1-4}-alkyl groups, wherein the polymerization is performed in the presence of the polyanion by using peroxodisulfuric acid as an oxidizing agent in an aqueous solvent and wherein the pH during polymerization is 1.5 or less and wherein said aqueous solvent is water and said polyanion is a polystyrene sulfonic acid.

10. (Previously Presented) A method for producing an aqueous dispersion containing a complex of poly(3,4-dialkoxythiophene) and a polyanion comprising:

polymerizing a 3,4-dialkoxythiophene represented by formula (1):



(1)

wherein R^1 and R^2 are C_{1-4}-alkyl groups, and wherein the polymerization is performed in the presence of the polyanion by using peroxodisulfuric acid as an oxidizing agent in an aqueous solvent, in which an acid selected from the group of water-soluble inorganic acids and water-soluble organic acids is added so as to lower pH of the resultant reaction mixture to 1.5 or less and wherein said aqueous solvent is water and said polyanion is a polystyrene sulfonic acid.

11. (Previously presented) The method as claimed in claim 7, wherein the pH during polymerization is 1.0 or less.

12. (Previously presented) The method as claimed in claim 8, wherein the pH during polymerization is 1.0 or less.

13. (Previously presented) The method as claimed in claim 9, wherein the pH during polymerization is 1.0 or less.

14. (Previously presented) The method as claimed in claim 10, wherein the pH during polymerization is 1.0 or less.

15. (Previously presented) The method as claimed in claim 8, wherein said acid is hydrochloric, sulfuric, nitric, phosphoric, p-toluenesulfonic, benzenesulfonic, methanesulfonic or trifluoromethanesulfonic.

16. (Previously presented) The method as claimed in claim 10, wherein said acid is hydrochloric, sulfuric, nitric, phosphoric, p-toluenesulfonic, benzenesulfonic, methanesulfonic or trifluoromethanesulfonic.

17. (Previoulsy presented) The method as claimed in claim 7, wherein said oxidizing agent is used in an amount from 1 to 5 equivalents with respect to one mole of the thiophene.

18. (Previously presented) The method as claimed in claim 7, wherein said oxidizing agent is used in an amount from 2 to 4 equivalents with respect to one mole of the thiophene.

19. (Previously presented) The method as claimed in claim 8, wherein said oxidizing agent is used in an amount from 1 to 5 equivalents with respect to one mole of the thiophene.

20. (Previously presented) The method as claimed in claim 8, wherein said oxidizing agent is used in an amount from 2 to 4 equivalents with respect to one mole of the thiophene.

21. (Previously presented) The method as claimed in claim 9, wherein said oxidizing agent is used in an amount from 1 to 5 equivalents with respect to one mole of the thiophene.

22. (Previously presented) The method as claimed in claim 9, wherein said oxidizing agent is used in an amount from 2 to 4 equivalents with respect to one mole of the thiophene.

23. (Previously presented) The method as claimed in claim 10, wherein said oxidizing agent is used in an amount from 1 to 5 equivalents with respect to one mole of the thiophene.

24. (Previously presented) The method as claimed in claim 10, wherein said oxidizing agent is used in an amount from 2 to 4 equivalents with respect to one mole of the thiophene.

25-26. Cancelled

27. (Previously presented) The method as claimed in claim 11, wherein said oxidizing agent is used in an amount from 2 to 4 equivalents with respect to one mole of the thiophene and the oxidizing agent comprises a catalytic amount of metal ions wherein the metal ions are iron, cobalt, nickel, molybdenum or vanadium ions.

28. (Previously presented) The method as claimed in claim 12, wherein said oxidizing agent is used in an amount from 2 to 4 equivalents with respect to one mole of the thiophene and the oxidizing agent comprises a catalytic amount of metal ions wherein the metal ions are iron, cobalt, nickel, molybdenum or vanadium ions.

APPENDIX B

No evidence pursuant to §§ 1.130, 1.131, or 1.132 or entered by or relied upon by the examiner is being submitted.

APPENDIX C

No related proceedings are referenced in II. above, hence copies of decisions in related proceedings are not provided.